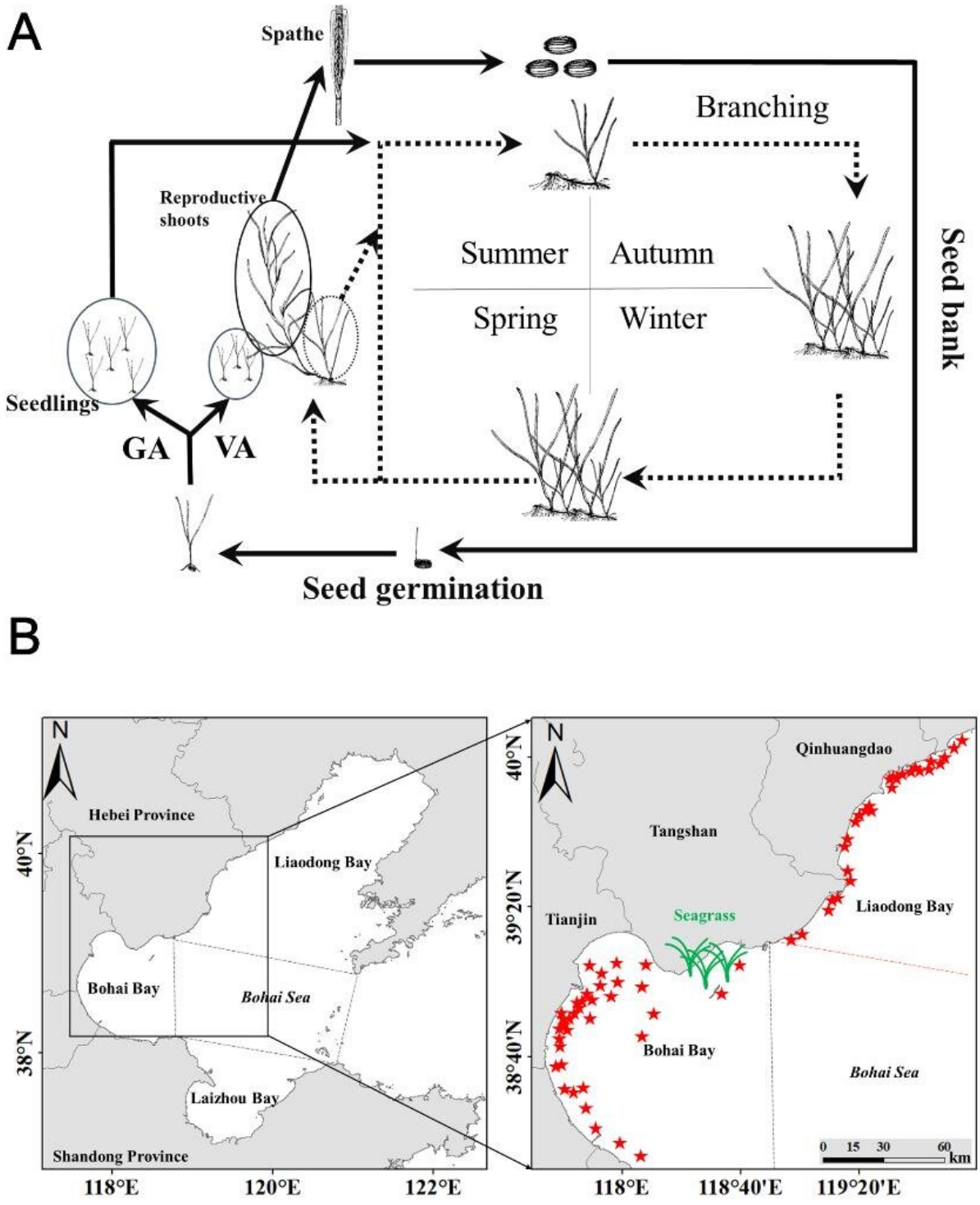
Adult eelgrass shoots rule seedling fate in large seagrass meadow in eutrophic bay of northern China

April 12 2022, by Li Yuan



Seasonal variability of Zostera marina sexual and asexual reproduction (A), and map showing red tide occurrences in Bohai Bay from 2000 to 2016 (B). Credit: IOCAS

Seagrasses are submerged marine angiosperms, which play key ecological roles in coastal ecosystems. The seagrass Zostera marina L. (eelgrass) is a marine foundation species and is the most widespread seagrass species throughout the Atlantic and Pacific coasts of the temperate northern hemisphere.

Bohai Bay, the representative semi-enclosed bay in northern China, has experienced severe eutrophication and overfishing in recent decades. There occurs a large eelgrass bed located in the northwest of the eutrophic bay.

Recently, a research team led by Prof. Zhou Yi from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS) provided new insights into the variability in Z. marina population recruitment in the large seagrass meadow.

The study was published in *Marine Pollution Bulletin* on April 7.

The researchers investigated eelgrass shoot density, height, biomass, plant reproductive effort, and seed bank density to analyze the temporal dynamics of asexual growth and sexual reproduction of eelgrass. They also identified the nutrient status of seawater and seagrass, as well as their ecological interactions in the large seagrass meadow.

They found that eelgrass seedlings appeared from April to July, and their density reached the highest level (~220 shoots m^{-2}) in May before decreasing. No seedlings were found in vegetated areas in June 2019, although a considerable number of seedlings, with a density of about 110 shoots m^{-2}, survived in the eelgrass meadow gaps. Vegetative shoot density significantly increased during autumn sampling period, with vegetative shoot density increasing more than four times.

"Asexual growth played an important role in the maintenance of existing meadows, and sexual reproduction played a critical role in the colonization of new areas. We suggest that adult eelgrass shoots do rule the fate of seedlings in the large seagrass meadow," said Dr. Xu Shaochun, first author of the study. This finding will provide fundamental information for large-scale eelgrass restoration in northern China.

The researchers also analyzed nutrient concentrations in seawater and seagrass, and revealed that nutrient resources Nitrogen (N) and Phosphorus (P) at this location were found to meet eelgrass growth demand. The N/P ratios of seawater and seagrass indicated N limitation relative to P in the eutrophic bay based on the seagrass Redfield ratio (25–30).

"It is likely that the effective nutrient uptake by seagrass plays an important role in reducing the probability of a red tide in the study area," said Prof. Zhou, the corresponding author of the study.

More information: Shaochun Xu et al, Do adult eelgrass shoots rule seedling fate in a large seagrass meadow in a eutrophic bay in northern China?, *Marine Pollution Bulletin* (2022). DOI: 10.1016/j.marpolbul.2022.113499

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